

WHAT IS CLAIMED IS:

1. A computerized method for making decisions based on evidential reasoning, said method comprising:

5 providing a model structure including a plurality of processing nodes, each of said processing nodes coupled to receive a set of inputs to supply a respective output;

evaluating a respective attribute assigned to each of the plurality of processing nodes;

10 specifying a number of possible linguistic evidential values for each of said attributes, wherein some of said evidential values comprise unknown information; and

combining the outputs from said processing nodes to reach a decision even in the presence of said unknown information, said combining configured to emulate expert data.

15 2. The computerized method of claim 1 wherein said model structure comprises a hierarchical model structure.

3. The computerized model of claim 2 wherein outputs from lower processing nodes are successively passed as inputs to higher level processing nodes until a final output is generated from the highest level processing node in the hierarchical model structure, said final output comprising said decision.

20 4. The computerized method of claim 1 wherein said expert data is collected during a learning stage from a plurality of examples for each of the processing nodes, each of the plurality of examples having a set of inputs, including some indicative of unknown information, and a corresponding output indicative of an expert opinion.

5 5. The computerized method of claim 4 wherein said plurality of examples is used during said learning stage to configure the processing nodes in the model structure to generate a final output from a given set of inputs, the model structure being configured so that said final output and the expert opinion from the plurality of examples are statistically equivalent to one another.

6. The computerized method of claim 5 further comprising identifying expert opinion that deviates from a majority of the plurality of examples.

7. The computerized method of claim 6 further comprising adjusting said identified expert opinion to correct any deviations therein.

10 8. The computerized method of claim 7 further comprising reconfiguring the processing nodes to include any adjusted expert opinion.

9. The computerized method of claim 6 further comprising disregarding said identified expert opinion to remove any deviations therein.

15 10. The computerized method of claim 9 further comprising reconfiguring the processing nodes omitting any disregarded expert opinion.

11. The computerized method of claim 1 further comprising making the model structure available over a global communications network during a production stage for processing financial service applications.

20 12. A computerized method for making decisions based on evidential reasoning, said decisions used for risk and credit analysis of financial service applications, said method comprising:

25 providing a hierarchical model structure for performing risk and credit analysis of financial service applications, said model structure including at least one input layer of processing nodes, said model further including an output layer having a processing node coupled to each of the processing nodes in the input layer;

evaluating a respective attribute indicative of a risk factor assigned to each of the plurality of processing nodes;

specifying a number of possible linguistic evidential values for each of said attributes and wherein some of said evidential values comprise unknown financial information; and

combining the outputs from said processing nodes to reach a decision regarding a given financial service application even in the presence of said unknown information, said combining configured to emulate expert data, wherein said expert data is collected during a learning stage from a plurality of examples for each of the processing nodes, each of the plurality of examples having a set of inputs, including some indicative of unknown financial information, and a corresponding output indicative of an expert opinion.

13. The computerized method of claim 12 wherein said plurality of examples comprises a plurality of hypothetical examples.

14. The computerized method of claim 12 wherein said plurality of examples comprises historical data from previously processed applications.

15. The computerized method of claim 12 wherein said plurality of examples is used during said learning stage to configure the processing nodes in the model structure to generate a final output from a set of inputs, the model structure being configured so that said final output and the expert opinion for the plurality of examples are statistically equivalent to one another.

16. The computerized method of claim 15 wherein said model structure is configured to provide a plurality of non-overlapping intervals over its possible output space, said model structure being further configured to optimize separation between any adjacent intervals of said possible output space so that said final output unambiguously maps into a single interval of said output space.

17. A computer-readable medium encoded with computer program code for making decisions based on evidential reasoning, said decisions used for risk and credit analysis of financial service applications, the program code causing a computer to execute a method comprising:

5 running a hierarchical model structure for performing risk and credit analysis of financial service applications, said model structure including at least one input layer of processing nodes, said model further including an output layer having a processing node coupled to each of the processing nodes in the input layer;

10 evaluating a respective attribute indicative of a risk factor assigned to each of the plurality of processing nodes;

 specifying a number of possible linguistic evidential values for each of said attributes and wherein some of said evidential values comprise unknown financial information; and

15 combining the outputs from said processing nodes to reach a decision regarding a given financial service application even in the presence of said unknown information, said combining configured to emulate expert data, wherein said expert data is collected during a learning stage from a plurality of examples for each of the processing nodes, each of the plurality of examples having a set of inputs, including some indicative of unknown financial information, and a corresponding output
20 indicative of an expert opinion, said model structure configured to provide a plurality of non-overlapping intervals over its possible output space, said model structure being further configured to optimize separation between any adjacent intervals of said possible output space so that its final output unambiguously maps into a single interval of said output space.

25 18. The computer-readable medium of claim 17 wherein said model structure is accessible in a production stage over a global communications network

 19. The computer-readable medium of claim 18 wherein said global communications network comprises the Internet.

20. A computerized system for making decisions based on evidential reasoning, said decisions used for risk and credit analysis of financial service applications, said system comprising:

5 memory configured to store a hierarchical model structure for performing risk and credit analysis of financial service applications, said model structure including at least one input layer of processing nodes, said model further including an output layer having a processing node coupled to each of the processing nodes in the input layer;

10 an evaluator module configured to evaluate a respective attribute indicative of a risk factor assigned to each of the plurality of processing nodes;

a data entry module configured to specify a number of possible linguistic evidential values for each of said attributes and wherein some of said evidential values comprise unknown financial information; and

15 a processor configured to combine the outputs from said processing nodes to reach a decision regarding a given financial service application even in the presence of said unknown information, said processor configured to emulate expert data, wherein said expert data is collected during a learning stage from a plurality of examples for each of the processing nodes, each of the plurality of examples having a set of inputs, including some indicative of unknown financial information, and a
20 corresponding output indicative of an expert opinion.